C150 • C300 Resilient Switches

Modular Force10 Operating System (FTOS) software delivers inherent stability

In-service diagnostics and traffic visibility tools increase control of network

Line-rate, non-blocking GbE and 10 GbE performance

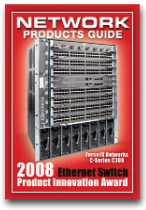
C-Series Resilient Switches

The Force10 Networks C-Series are resilient chassis-based switches that deliver reliability, network control and scalability. The C-Series is designed to support mission critical applications with very low latency across converged networks. Comprehensive management capabilities make the C-Series a cost-effective and flexible deployment option.

Key Applications

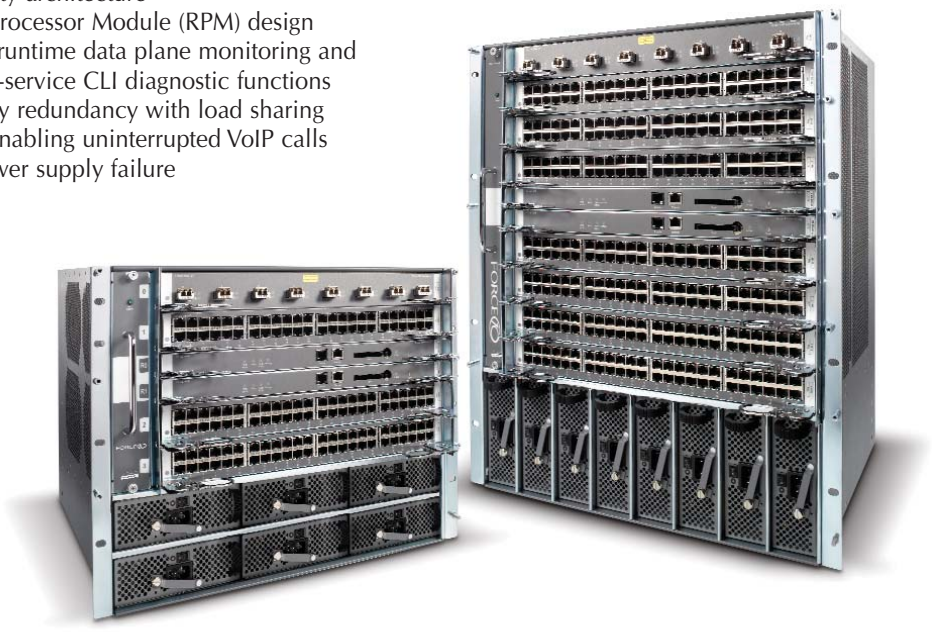
- Low cost 100/1000 Mbps server aggregation for small- to medium-sized data centers (100s to 1,000s of servers)
- Cost-effective LAN core switch for small- and medium-campuses (100s to 1,000s of PCs)
- High density GbE aggregation for distribution into a multiple Gbps or 10 GbE backbone
- Cost-effective PoE-enabled 10/100/1000Base-T wiring closet aggregation of VoIP phones, wireless access points, video cameras or other IEEE 802.3af-compliant devices

Key Features



The Force10 C-Series is designed to provide inherent reliability, network control, and scalability for high performance Ethernet environments.

- Up to 384 line-rate 10/100/1000Base-T ports with full 15.4 W Class 3 PoE support in a 13-RU chassis
- Up to 64 line-rate 10 GbE ports with pluggable XFP modules
- Suite of security, access control and wiring closet edge features for enterprise networks
- VirtualView real-time network and application traffic monitoring for virtualized data centers
- PowerSmart intelligent power management features provide automatic sensing, provisioning and management of PoE power
- Full complement of standards-based Layer 2, IPv4 and IPv6 features for unicast and multicast applications
- 5 microsecond switching latency under full load for 64 byte frames
- Switch fabric capacity of up to 1.536 Tbps and up to 952 Mpps L2/L3 packet forwarding capacity
- High availability architecture
  - 1+1 Route Processor Module (RPM) design
  - Continuous runtime data plane monitoring and advanced in-service CLI diagnostic functions
  - Power supply redundancy with load sharing power bus enabling uninterrupted VoIP calls during a power supply failure



FORCE10

Specifications: C-Series Resilient Switches

Ordering Information

Order Number	Description
CH-C150	C150 4-slot chassis with backplane
CH-C300	C300 8-slot chassis with backplane
CC-C150-FAN2	C150 enhanced fan subsystem
CC-C300-FAN2	C300 enhanced fan subsystem
LC-CB-RPM	Switch Fabric and Route Processor Module (series CB)
LC-CB-10GE-4P	4-port 10 Gigabit Ethernet line card, XFP modules required (series CB)
LC-CB-10GE-8P	8-port 10 Gigabit Ethernet line card, XFP modules required (series CB)
LC-CB-GE-48P	48-port Gigabit Ethernet line card, SFP modules required (series CB)
LC-CB-GE-48T	48-port 10/100/1000Base-T line card with RJ45 interfaces (series CB)
LC-CB-GE-48V	48-port 10/100/1000Base-T line card with RJ45 interfaces and PoE (series CB)
LC-CB-10G-1G-36T	FlexMedia line card with 36 10/100/1000Base-T RJ45 interfaces, eight GbE interfaces – SFP modules required, and two 10 GbE interfaces – SFP+ modules required (series CB)
LC-CB-10G-1G-36V	FlexMedia line card with 36 10/100/1000Base-T RJ45 interfaces with PoE, eight GbE interfaces – SFP modules required, and two 10 GbE interfaces – SFP+ modules required (series CB)
CC-C-1200W-AC	1200 W AC Power Supply Module
CC-C-PWR-DC	1400 W DC Power Entry Module
SW-CB-LATEST	FTOS software

Chassis

C300 – 8 line card slots
2 Route processor module with integrated switch fabric slots
8 Power supply module slots and 1 fan tray slot
Size: 13 RU, 22.7 h x 17.4 w x 14.4" d (57.66 h x 44.2 w x 37.58 cm d)
Weight with factory-installed components: 55 lbs (24.95 kg)
Weight fully loaded: 152.27 lbs (69.07 kg)
ISO 7779 A-weighted sound pressure level: 73.8 dBA at 73.4°F (23°C)
AC power
- Nominal input voltage: 100–240 VAC 50/60 Hz
- Maximum thermal output: 4,978 BTU/h (1,498 W) at 100/120 VAC; 4,864 BTU/h (1,459 W) at 200/220 VAC
- Maximum input current per module: 14 A at 100 VAC, 12 A at 120 VAC, 7 A at 200 VAC, 6 A at 240 VAC
- Maximum system power input: 8.7 KVA at 100/120 VAC, 8.5 KVA at 200/240 VAC
- Maximum power consumption: 8,675 W at 100/120 VAC, 8,476 W at 200/240 VAC

DC power
- Nominal input voltage: –44 to –55 VDC
- Maximum thermal output: 4,231 BTU/h (1,240 W)
- Maximum current draw per DC PEM: 32 A
- Maximum power consumption: 1,460 W

C150 – 4 line card slots
2 Route processor module with integrated switch fabric slots
6 Power supply module slots and 1 fan tray slot
Size: 9 RU, 15.7 h x 17.5 w x 15.3" d (39.88 h x 44.45 w x 38.86 cm d)
Weight with factory-installed components: 38 lbs (17.24 kg)
Weight fully loaded: 86.63 lbs (39.29 kg)
ISO 7779 A-weighted sound pressure level: 69.3 dBA at 73.4°F (23°C)
AC power
- Nominal input voltage: 100–240 VAC 50/60 Hz
- Maximum thermal output: 2,891 BTU/h (862 W) at 100/120 VAC; 2,824 BTU/h (840 W) at 200/220 VAC
- Maximum input current per module: 14 A at 100 VAC, 12 A at 120 VAC, 7 A at 200 VAC, 6 A at 240 VAC
- Maximum system power input: 4.5 KVA at 100/120 VAC, 4.4 KVA at 200/240 VAC
- Maximum power consumption: 4,420 W at 100/120 VAC, 4,319 W at 200/240 VAC

DC power
- Nominal input voltage: –44 to –55 VDC
- Maximum thermal output: 2,457 BTU/h (720 W)
- Maximum current draw per DC PEM: 32 A
- Maximum power consumption: 800 W

Common
19" front rack mountable
Maximum operating specifications:
- Temperature: 32° to 104°F (0° to 40°C)
- Altitude: no performance degradation to 10,000 feet (3,048 meters)
- Relative humidity: 5 to 85% (RH), non-condensing

Maximum non-operating specifications:
- Temperature: -40° to 158°F (-40° to 70°C)
- Maximum altitude: 15,000 feet (4,572 meters)
- Relative humidity: 5 to 95% (RH), non-condensing

Redundancy/Availability

1+1 redundant Switch Fabric & Route Processor Modules (RPM)
C300: 2+1 redundant system AC Power Supply Modules
- 1+1 redundant system DC Power Entry Modules
- 4+1 redundant PoE Power Supply Modules supporting up to 384 PoE ports at 15.4 W with deterministic failure mode

C150: 1+1 redundant system AC Power Supply Modules
- 1+1 redundant system DC Power Entry Modules
- 2+2 redundant PoE Power Supply Modules supporting up to 192 PoE ports at 15.4 W with deterministic failure mode

Online insertion and removal of all components
Environmental self-monitoring

Performance

MAC addresses:	C150: 256K, C300: 512K
IPv4 routes:	12K
IPv6 routes:	6K
Switching fabric capacity:	C150: 768 Gbps (476 Mpps) C300: 1,536 Tbps (952 Mpps)
Link aggregation:	8 links per group, 128 groups per chassis
Queues per port:	4 queues
VLANs:	1024 VLANs with 4096 tag value support
Line-rate Layer 2 switching:	all protocols, including IPv4 and IPv6
Line-rate Layer 3 routing:	IPv4 and IPv6
LAG load balancing:	based on Layer 2, IPv4 or IPv6 headers
Switching latency:	<5 µs for 64 byte frames

IEEE Compliance

802.1AB	LLDP
802.1D	Bridging, STP
802.1p	L2 Prioritization
802.1Q	VLAN Tagging, Double VLAN Tagging, GVRP
802.1s	MSTP
802.1w	RSTP
802.1X	Network Access Control
802.3ab	Gigabit Ethernet (1000BASE-T)
802.3ac	Frame Extensions for VLAN Tagging
802.3ad	Link Aggregation with LACP
802.3ae	10 Gigabit Ethernet (10GBASE-X)
802.3af	Power over Ethernet
802.3ak	10 Gigabit Ethernet (10GBASE-CX4)
802.3i	Ethernet (10BASE-T)
802.3u	Fast Ethernet (100BASE-FX, 100BASE-TX)
802.3x	Flow Control
802.3z	Gigabit Ethernet (1000BASE-X)
ANSI/TIA-1057	LLDP-MED
Force10	FRRP (Force10 Redundant Ring Protocol)
Force10	PVST+
MTU	9,252 bytes

RFC and I-D Compliance

General Internet Protocols

768	UDP	1350	TFTP
793	TCP	2474	Differentiated Services
854	Telnet	3164	Syslog
959	FTP	draft-ietf-bfd-base-03	BFD
1321	MD5		

General IPv4 Protocols

791	IPv4	1812	Routers
792	ICMP	1858	IP Fragment Filtering
826	ARP	2131	DHCP (server and relay)
1027	Proxy ARP	2338	VRRP
1035	DNS (client)	3021	31-bit Prefixes
1042	Ethernet Transmission	3046	DHCP Option 82
1191	Path MTU Discovery	3069	Private VLAN
1305	NTPv3	3128	Tiny Fragment Attack Protection
1519	CIDR		
1542	BOOTP (relay)		

General IPv6 Protocols

1981	Path MTU Discovery (partial)	2464	Ethernet Transmission
2460	IPv6	2675	Jumbograms
2461	Neighbor Discovery (partial)	3587	Global Unicast Address Format
2462	Stateless Address Autoconfiguration (partial)	4291	Addressing
2463	ICMPv6		

RIP

1058	RIPv1	2453	RIPv2

OSPF

1587	NSSA	2740	OSPFv3
2154	MD5	3623	Graceful Restart
2328	OSPFv2	4222	Prioritization and Congestion Avoidance
2370	Opaque LSA		

BGP

1997	Communities	2858	Multiprotocol Extensions
2385	MD5	2918	Route Refresh
2439	Route Flap Damping	3065	Confederations
2545	Multiprotocol Extensions for IPv6	4360	Extended Communities
2796	Route Reflection	4893	4-byte ASN
2842	Capabilities	5396	4-byte ASN Representation
draft-ietf-idr-bgp4-20	BGPv4		
draft-ietf-idr-restart-06	Graceful Restart		

Multicast

1112	IGMPv1	4541	IGMPv1/v2 Snooping
2236	IGMPv2	draft-ietf-pim-sm-v2-new-05	PIM-SM for IPv4
3376	IGMPv3		
3569	SSM for IPv4		

Network Management

1155	SMIv1	2865	RADIUS
1156	Internet MIB	3273	RMON High Capacity MIB
1157	SNMPv1	3376	IGMPv3
1212	Concise MIB Definitions	3416	SNMPv2
1215	SNMP Traps	3418	SNMP MIB
1493	Bridges MIB	3434	RMON High Capacity Alarm MIB
1850	OSPFv2 MIB	3580	802.1X with RADIUS
1901	Community-based SNMPv2	5060	PIM MIB
2011	IP MIB	ANSI/TIA-1057	LLDP-MED MIB
2012	TCP MIB	draft-grant-tacacs-02	TACACS+
2013	UDP MIB	draft-ietf-idr-bgp4-mib-06	BGP MIBv1
2024	DLSw MIB	IEEE 802.1AB	LLDP MIB, LLDP DOT1 MIB, LLDP DOT3 MIB
2096	IP Forwarding Table MIB	ruzin-mstp-mib-02	MSTP MIB (traps)
2570	SNMPv3	sFlow.org	sFlowv5
2571	Management Frameworks	sFlow.org	sFlowv5 MIB (version 1.3)
2572	Message Processing and Dispatching	FORCE10-BGP4-V2-MIB	
2574	SNMPv3 USM	FORCE10-CS-CHASSIS-MIB	
2575	SNMPv3 VACM	FORCE10-IF-EXTENSION-MIB	
2576	Coexistence Between SNMPv1/v2/v3	FORCE10-LINKAGG-MIB	
2578	SMIv2	FORCE10-COPY-CONFIG-MIB	
2579	Textual Conventions for SMIv2	FORCE10-MON-MIB	
2580	Conformance Statements for SMIv2	FORCE10-PRODUCTS-MIB	
2618	RADIUS Authentication MIB	FORCE10-SMI	
2665	Ethernet-like Interfaces MIB	FORCE10-SYSTEM-COMPONENT-MIB	
2674	Extended Bridge MIB	FORCE10-TC-MIB	
2787	VRRP MIB	FORCE10-TRAP-ALARM-MIB	
2819	RMON MIB (groups 1, 2, 3, 9)		
2863	Interfaces MIB		

Regulatory Compliance

Safety
UL/CSA 60950-1, 1st Edition
EN 60950-1, 1st Edition
IEC 60950-1, 1st Edition Including all National Deviations and Group Differences
EN 60825-1 Safety of Laser Products Part 1: Equipment Classification Requirements and User's Guide
EN 60825-2 Safety of Laser Products Part 2: Safety of Optical Fibre Communication Systems
FDA Regulation 21 CFR 1040.10 and 1040.11

Emissions
Australia/New Zealand: AS/NZS CISPR 22: 2006, Class A
Canada: ICES-003, Issue-4, Class A
Europe: EN 55022: 2006 (CISPR 22: 2006), Class A
Japan: VCCI V3/2007.04 Class A
USA: FCC CFR 47 Part 15, Subpart B, Class A

Immunity
EN 300 386 V1.3.3: 2005 EMC for Network Equipment
EN 55024: 1998 + A1: 2001 + A2: 2003
EN 61000-3-2: Harmonic Current Emissions
EN 61000-3-3:Voltage Fluctuations and Flicker
EN 61000-4-2: ESD
EN 61000-4-3: Radiated Immunity
EN 61000-4-4: EFT
EN 61000-4-5: Surge
EN 61000-4-6: Low Frequency Conducted Immunity

RoHS
All C-Series components are EU RoHS compliant.

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